CLAIMS

What is claimed is:

1. An implantable lead comprising:

a lead body having a proximal end portion and a distal end portion, the lead body including a conductive polymer electrode disposed along the distal end portion of the lead body for performing one or more of the functions consisting of pacing, sensing, cardioversion and defibrillation; and

a cable conductor contained within the lead body, the cable conductor coupling the proximal end portion of the lead body with the conductive polymer electrode, the conductive polymer electrode encapsulating the cable conductor and being in electrical contact therewith along the length of the conductive polymer electrode.

2. The lead of claim 1 in which:

the conductive polymer electrode is disposed within a window formed in the lead body.

3. The lead of claim 2 in which:

the distal end portion of the lead body is isodiametric.

4. The lead of claim 2 in which:

the distal end portion of the lead body has an outer circumferential surface, the window extending about a portion of the outer circumferential surface.

5. The lead of claim 1 further including:

at least one additional cable conductor, redundant with the first mentioned cable conductor, contained within the lead body,

the conductive polymer electrode encapsulating the at least one additional cable conductor along the length of the electrode.

6. The lead of claim 5 in which:

the lead body comprises a multilumen housing, the first mentioned cable being contained within a first one of the lumens of the multilumen housing and the at least one additional cable conductor being contained within a second one of the lumens of the multilumen housing.

7. The lead of claim 5 in which:

the lead body comprises a multilumen housing, the first mentioned cable and the at least one additional cable conductor being contained within one of the lumens of the multilumen housing.

8. The lead of claim 2 in which:

the window and the conductive polymer electrode disposed therein extend helically about the lead body.

9. The lead of claim 8 in which:

the cable conductor extends longitudinally along the lead body and intercepts the helical conductive polymer electrode at longitudinally spaced apart points along the lead body.

10. The lead of claim 9 further including:

at least one additional cable conductor, redundant with the first mentioned cable conductor, contained within the lead body, the at least one additional cable conductor extending longitudinally along the lead body and intercepting the helical conductive polymer electrode at longitudinally spaced apart points along the lead body.

11. The lead of claim 10 in which:

the lead body comprises a multilumen housing, the first mentioned cable being contained within a first one of the lumens of the multilumen housing and the at least one additional cable conductor being contained within a second one of the lumens of the multilumen housing.

12. The lead of claim 10 in which:

the lead body comprises a multilumen housing, the first mentioned cable and the at least one additional cable conductor being contained within one of the lumens of the multilumen housing.

13. The lead of claim 8 in which:

the cable conductor is encapsulated within the helically extending conductive polymer electrode and follows the helical path thereof.

14. The lead of claim 1 in which:

the portion of the cable conductor encapsulated by the conductive polymer electrode includes area-increasing structure for enhancing the bond between the electrode and the cable conductor.

15. The lead of claim 14 in which:

the area-increasing structure is selected from the group consisting of a roughened surface of the cable conductor, a knurled surface of the cable conductor, projections extending from a surface of the cable conductor, beads attached to a surface of the cable conductor, mesh attached to a surface of the cable conductor, longitudinally spaced apart wire loops attached to a

surface of the cable conductor, and wire wound around and attached to a surface of the cable conductor.

16. The lead of claim 1 in which:

the conductive polymer electrode comprises at least two electrode sections disposed within a corresponding number of windows formed in the lead body and spaced apart along the length thereof.

17. The lead of claim 1 in which:

the conductive polymer comprises a polymer formulated to be intrinsically conductive.

18. The lead of claim 17 in which:

the conductive polymer is selected from the group consisting of polyacetylene, polypyrrole, polyaniline, polythiophene, fluorophenyl thiophene, polyphenylene vinylene, polyphenylene sulfide, polynaphthalene, and polyphenylene.

19. The lead of claim 1 in which:

the conductive polymer comprises an insulating, biocompatible polymer having conductive particles dispersed therein.

20. The lead of claim 19 in which:

the insulating polymer is selected from the group consisting of silicone rubber, polyurethane, and styrene-ethylene-butylene-styrene block polymer.

21. The lead of claim 19 in which:

the conductive particles comprise particles selected from the group consisting of silver, stainless steel, iridium, silver-coated

nickel, carbon black, graphite, tantalum, palladium, titanium, platinum, gold, MP35N, fullerines, and carbon nanotubes.

22. The lead of claim 1 in which:

the conductive polymer electrode comprises a molded structure.

23. The lead of claim 1 which includes:

a second conductive polymer electrode disposed along the distal end portion of the lead body for performing one or more of the functions of pacing, sensing, cardioversion and defibrillation, the second conductive polymer electrode being longitudinally spaced apart from the first mentioned conductive polymer electrode; and

a second cable conductor contained within the lead body and coupling the proximal end portion of the lead body with the second conductive polymer electrode, the second conductive polymer electrode encapsulating the second cable conductor and being in electrical contact therewith along the length of the second conductive polymer electrode.

24. The lead of claim 23 in which:

the distal end portion of the lead body is adapted for implantation within the right side of a heart, wherein the first mentioned conductive polymer electrode is positioned along the length of the distal end portion of the lead body to deliver electrical stimuli to the tissue of the right ventricle of the heart, and the second conductive polymer electrode is positioned along the length of the distal end portion of the lead body to deliver electrical stimuli to the tissue of the superior vena cava of the heart.

25. The lead of claim 23 in which:

the distal end portion of the lead body is adapted for left side implantation, wherein the first mentioned conductive polymer electrode is positioned along the length of the distal end portion of the lead body to deliver electrical stimuli to the wall of a vessel in the coronary sinus region of the heart, and the second conductive polymer electrode is positioned along the length of the distal end portion of the lead body to deliver electrical stimuli to the tissue of the superior vena cava of the heart.

26. The lead of claim 23 in which:

the distal end portion of the lead body is adapted for left side implantation, wherein the first mentioned conductive polymer electrode is positioned along the length of the distal end portion of the lead body to deliver electrical stimuli to the coronary sinus of the heart, and the second conductive polymer electrode is positioned along the length of the distal end portion of the lead body to deliver electrical stimuli to a vein overlying the left side of the heart.

27. The lead of claim 23 in which:

the lead body includes a multilumen housing, a first one of the lumens of the housing containing the first mentioned cable conductor and a second one of the lumens containing the second cable conductor.

28. The lead of claim 27 in which:

the housing includes a third lumen, the third lumen containing a lining extending from the proximal end portion of the lead body to the distal end portion thereof, the lining passing through the lengths of the first and the second conductive polymer

electrodes and being encapsulated thereby, the lining being adapted to guide a stylet during implantation of the lead.

29. An implantable lead comprising:

a lead body having a proximal end portion and a distal end portion, the lead body comprising a tubular, insulative, multilumen housing including a conductive polymer electrode disposed within a window formed in the housing along the distal end portion of the lead body, the electrode performing one or more of the functions consisting of pacing, sensing, cardioversion and defibrillation; and

a conductor contained within one of the lumens of the multilumen housing, the conductor coupling the proximal end portion of the lead body with the conductive polymer electrode, the conductive polymer electrode encapsulating the conductor and being in electrical contact therewith along substantially the entire length of the conductive polymer electrode.

30. The lead of claim 29 in which:

the conductor comprises a cable conductor.

31. The lead of claim 29 in which:

the conductor comprises a coil conductor.

32. The lead of claim 29 in which:

the distal end portion of the lead body is isodiametric.

33. The lead of claim 29 in which:

the distal end portion of the lead body has an outer circumferential surface, the window extending about a portion of the outer circumferential surface.

34. The lead of claim 29 further including:

at least one additional conductor, redundant with the first mentioned conductor, contained within the lumen of the multilumen housing, the conductive polymer electrode encapsulating the at least one additional conductor along substantially the entire length of the electrode.

35. The lead of claim 29 further including:

at least one additional conductor, redundant with the first mentioned conductor, contained within another one of the lumens of the multilumen housing, the conductive polymer electrode encapsulating the at least one additional conductor along substantially the entire length of the electrode.

36. The lead of claim 29 in which:

the window and the conductive polymer electrode disposed therein extend helically about the lead body.

37. The lead of claim 36 in which:

the conductor is encapsulated within the helically extending conductive polymer electrode and follows the helical path thereof.

38. The lead of claim 29 in which:

the portion of the conductor encapsulated by the conductive polymer electrode includes area-increasing structure for enhancing the bond between the electrode and the conductor.

39. The lead of claim 38 in which:

the area-increasing structure is selected from the group consisting of a roughened surface of the conductor, a knurled surface of the conductor, projections extending from a surface of the conductor, beads attached to a surface of the conductor, mesh

attached to a surface of the conductor, longitudinally spaced apart wire loops attached to a surface of the conductor, and wire wound around and attached to a surface of the conductor.

40. The lead of claim 29 in which:

the conductive polymer electrode comprises at least two electrode sections disposed within a corresponding number of windows formed in the housing and spaced apart along the length thereof.

41. The lead of claim 29 in which:

the conductive polymer comprises a polymer formulated to be intrinsically conductive.

42. The lead of claim 41 in which:

the conductive polymer is selected from the group consisting of polyacetylene, polypyrrole, polyaniline, polythiophene, fluorophenyl thiophene, polyphenylene vinylene, polyphenylene sulfide, polynaphthalene, and polyphenylene.

43. The lead of claim 29 in which:

the conductive polymer comprises an insulating, biocompatible polymer having conductive particles dispersed therein.

44. The lead of claim 43 in which:

the insulating polymer is selected from the group consisting of silicone rubber, polyurethane, and styrene-ethylene-butylene-styrene block polymer.

45. The lead of claim 43 in which:

the conductive particles comprise particles selected from the group consisting of silver, stainless steel, iridium, silver-coated nickel, carbon black, graphite, tantalum, palladium, titanium, platinum, gold, MP35N, fullerines, and carbon nanotubes.

46. The lead of claim 29 in which:

the conductive polymer electrode comprises a molded structure.

47. The lead of claim 29 which includes:

a second conductive polymer electrode disposed along the distal end portion of the lead body for performing one or more of the functions of pacing, sensing, cardioversion and defibrillation; and

a second conductor contained within the housing and extending from the proximal end portion of the lead body into the distal end portion of the lead body, the second conductive polymer electrode encapsulating the second conductor and being in electrical contact therewith along substantially the entire length of the second conductive polymer electrode.

48. The lead of claim 47 in which:

the distal end portion of the lead body is adapted for implantation within the right side of a heart, wherein the first mentioned conductive polymer electrode is positioned along the length of the distal end portion of the lead body to deliver electrical stimuli to the tissue of the right ventricle of the heart, and the second conductive polymer electrode is positioned along the length of the distal end portion of the lead body to deliver electrical stimuli to the tissue of the superior vena cava of the heart.

49. The lead of claim 47 in which:

the distal end portion of the lead body is adapted for left side implantation, wherein the first mentioned conductive polymer electrode is positioned along the length of the distal end portion of the lead body to deliver electrical stimuli to the wall of a vessel in the coronary sinus region of the heart, and the second conductive polymer electrode is positioned along the length of the distal end portion of the lead body to deliver electrical stimuli to the tissue of the superior vena cava of the heart.

50. The lead of claim 47 in which:

the distal end portion of the lead body is adapted for left side implantation, wherein the first mentioned conductive polymer electrode is positioned along the length of the distal end portion of the lead body to deliver electrical stimuli to the coronary sinus of the heart, and the second conductive polymer electrode is positioned along the length of the distal end portion of the lead body to deliver electrical stimuli to a vein overlying the left side of the heart.

51. A body implantable lead adapted to transmit electrical signals between a proximal end of the lead and a distal end portion of the lead, the distal end portion of the lead having a distal extremity including a tip electrode adapted to engage cardiac tissue and to electrically stimulate the tissue and/or sense electrical stimuli therefrom, the lead comprising:

a first electrical conductor extending from a connector assembly at the proximal end of the lead, the first electrical conductor having a distal extremity electrically connected to the tip electrode;

a second electrical conductor, electrically insulated from the first conductor, extending from the connector assembly at the proximal end of the lead into the distal end portion of the lead;

a generally tubular, insulating housing of biocompatible, biostable polymer material extending between the proximal end and the distal end portion of the lead and enclosing the conductors except along an exposed section of the second conductor, the exposed section of the second conductor being disposed within the distal end portion of the lead; and

a conductive polymer electrode encapsulating the exposed section of the second conductor and being in electrical contact therewith along substantially the entire length of the exposed section, the conductive polymer electrode comprising a cardioverting and/or defibrillating electrode.

52. The lead of claim 51 in which:

the conductive polymer electrode is positioned along the length of the distal end portion of the lead to deliver cardioverting and/or defibrillating electrical stimuli to the tissue of the superior vena cava.

53. The lead of claim 51 in which:

the conductive polymer electrode is positioned along the length of the distal end portion of the lead to deliver cardioverting and/or defibrillating electrical stimuli to the coronary sinus.

54. The lead of claim 51 in which:

the conductive polymer electrode is positioned along the length of the distal end portion of the lead to deliver cardioverting and/or defibrillating electrical stimuli to a vein overlying the left side of the heart.

55. The lead of claim 51 in which:

the conductive polymer electrode is positioned along the length of the distal end portion of the lead to deliver cardioverting

and/or defibrillating electrical stimuli to the tissue of a ventricle of the heart.

56. The lead of claim 55 in which:

the conductive polymer electrode is positioned along the length of the distal end portion of the lead to deliver cardioverting and/or defibrillating electrical stimuli to the right ventricle of the heart.

57. The lead of claim 55 in which:

the conductive polymer electrode is positioned along the length of the distal end portion of the lead to deliver cardioverting and/or defibrillating electrical stimuli to the left ventricle of the heart.

58. The lead of claim 57 in which:

the conductive polymer electrode is positioned along the length of the distal end portion of the lead so as to contact a wall of a vessel in the coronary sinus region of the heart.

59. The lead of claim 51 in which:

the conductive polymer electrode and the tubular insulating housing are isodiametric.

60. The lead of claim 51 in which:

the second conductor is a coil conductor.

61. The lead of claim 60 in which:

the first and second conductors comprise coaxial coil conductors, the first conductor being disposed within the lumen of the second coil conductor.

62. The lead of claim 51 in which:

the second conductor comprises at least one cable conductor.

63. The lead of claim 62 in which:

the at least one cable conductor is insulated except along the exposed section.

64. The lead of claim 51 in which:

the housing comprises a multilumen housing, each of the first and the second conductors being contained within a separate lumen of the multilumen housing.

65. The lead of claim 64 in which:

the first conductor comprises a coil conductor; and

the second conductor comprises at least one cable conductor.

66. The lead of claim 65 in which:

the second conductor comprises two cable conductors.

67. The lead of claim 51 in which:

each of the first and the second electrical conductors comprises a cable conductor.

68. The lead of claim 51 in which:

the conductive polymer electrode comprises a polymer formulated to be intrinsically conductive.

69. The lead of claim 68 in which:

the conductive polymer is selected from the group consisting of polyacetylene, polypyrrole, polyaniline, polythiophene, fluorophenyl thiophene, polyphenylene vinylene, polyphenylene sulfide, polynaphthalene, and polyphenylene.

70. The lead of claim 51 in which:

the conductive polymer electrode comprises an insulating, biocompatible polymer having conductive particles dispersed therein.

71. The lead of claim 70 in which:

the insulating polymer is selected from the group consisting of silicone rubber, polyurethane, and styrene-ethylene-butylene-styrene block polymer.

72. The lead of claim 70 in which:

the conductive particles comprise particles selected from the group consisting of silver, stainless steel, iridium, silver-coated nickel, carbon black, graphite, tantalum, palladium, titanium, platinum, gold, MP35N, fullerines, and carbon nanotubes.

73. The lead of claim 51 in which:

the conductive polymer electrode comprises a molded structure.

74. A body implantable lead adapted to transmit electrical signals between a proximal end of the lead and a distal end portion of the lead, the distal end portion of the lead including a tip electrode adapted to engage cardiac tissue and to electrically stimulate the tissue and/or sense electrical stimuli therefrom, the lead comprising:

a tip electrode conductor connecting the proximal end of the lead with the tip electrode;

at least one additional electrical conductor extending from the proximal end of the lead into the distal end portion of the lead;

a generally tubular insulating, multilumen housing of biocompatible, biostable material extending between the proximal end and the distal end portion of the lead, the tip electrode conductor being contained within a first lumen of the multilumen housing and the at least one additional electrical conductor being contained within at least one of the remaining lumens of the multilumen housing, the housing enclosing the at least one additional electrical conductor except along an exposed section thereof, the exposed section of the at least one additional conductor being disposed within the distal end portion of the lead; and

a conductive polymer electrode contained within a window formed in the multilumen housing, the electrode encapsulating the exposed section of the at least one additional conductor and being in electrical contact with the exposed section, the conductive polymer being adapted to engage cardiac tissue and to perform one or more of the functions consisting of pacing, sensing, cardioversion and defibrillation.

75. The lead of claim 74 in which:

the tip electrode conductor comprises a coil conductor.

76. The lead of claim 74 in which:

the at least one additional conductor comprises a cable conductor.

77. The lead of claim 76 in which:

the portion of the cable conductor encapsulated by the conductive polymer electrode includes area-increasing structure for enhancing the bond between the electrode and the cable conductor.

78. The lead of claim 77 in which:

the area-increasing structure is selected from the group consisting of a roughened surface of the cable conductor, a knurled surface of the cable conductor, projections extending from a surface of the cable conductor, beads attached to a surface of the cable conductor, mesh attached to a surface of the cable conductor, longitudinally spaced apart wire loops attached to a surface of the cable conductor, and wire wound around and attached to a surface of the cable conductor.

79. The lead of claim 76 in which:

the cable conductor comprises a multistrand conductor.

80. The lead of claim 76 in which:

the tip electrode conductor comprises a cable conductor.

81. The lead of claim 80 in which:

the tip electrode cable conductor comprises a multistrand conductor.

82. The lead of claim 74 in which:

the multilumen housing includes a lumen containing a polymer liner for guiding a stylet during implantation of the lead.

83. The lead of claim 82 in which:

the polymer lining is made of PTFE.

84. The lead of claim 74 in which:

the conductive polymer electrode and the tubular housing are isodiametric.

85. The lead of claim 74 in which:

the conductive polymer electrode is positioned along the length of the distal end portion of the lead assembly to deliver cardioverting and/or defibrillating electrical stimuli to the tissue of the superior vena cava.

86. The lead of claim 74 in which:

the conductive polymer electrode is positioned along the length of the distal end portion of the lead to deliver cardioverting and/or defibrillating electrical stimuli to the tissue of a ventricle of the heart.

87. The lead of claim 74 in which:

the conductive polymer electrode is positioned along the length of the distal end portion of the lead to deliver cardioverting and/or defibrillating electrical stimuli to the coronary sinus of the heart.

88. The lead of claim 74 in which:

the conductive polymer electrode is positioned along the length of the distal end portion of the lead to deliver cardioverting and/or defibrillating electrical stimuli to a vein overlying the left side of the heart.

89. The lead of claim 74 in which:

the distal end portion of the lead body has an outer circumferential surface, the window extending about a portion of the outer circumferential surface.

90. The lead of claim 74 in which:

the conductive polymer electrode comprises at least two electrode sections disposed within a corresponding number of windows formed in the lead body and spaced apart along the length thereof.

91. The lead of claim 74 in which:

the conductive polymer comprises a polymer formulated to be intrinsically conductive.

92. The lead of claim 91 in which:

the conductive polymer is selected from the group consisting of polyacetylene, polypyrrole, polyaniline, polythiophene, fluorophenyl thiophene, polyphenylene vinylene, polyphenylene sulfide, polynaphthalene, and polyphenylene.

93. The lead of claim 74 in which:

the conductive polymer comprises an insulating, biocompatible polymer having conductive particles dispersed therein.

94. The lead of claim 93 in which:

the insulating polymer is selected from the group consisting of silicone rubber, polyurethane, and styrene-ethylene-butylene-styrene block polymer.

95. The lead of claim 93 in which:

the conductive particles comprise particles selected from the group consisting of silver, stainless steel, iridium, silver-coated nickel, carbon black, graphite, tantalum, palladium, titanium, platinum, gold, MP35N, fullerines, and carbon nanotubes.

96. An implantable lead comprising:

a lead body having a proximal end portion and a distal end portion;

a first conductive polymer electrode disposed along the distal end portion of the lead body for performing one or more of the functions consisting of pacing, sensing, cardioversion and defibrillation;

a first cable conductor contained within the lead body and extending from the proximal end portion into the distal end portion of the lead body, the conductive polymer electrode encapsulating the cable conductor and being in electrical contact therewith along the length of the conductive polymer electrode;

a second conductive polymer electrode disposed along the distal end portion of the lead body for performing one or more of the functions of pacing, sensing, cardioversion and defibrillation, the second conductive polymer electrode being longitudinally spaced apart from the first conductive polymer electrode; and

a second cable conductor contained within the lead body and extending from the proximal end portion into the distal end portion of the lead body, the second conductive polymer electrode encapsulating the second cable conductor and being in electrical contact therewith along the length of the second conductive polymer electrode.

97. The lead of claim 96 in which:

the first and second conductive polymer electrodes are disposed within windows formed in the lead body.

98. The lead of claim 96 in which:

the distal end portion of the lead body is adapted for implantation within the right side of a heart;

the first mentioned conductive polymer electrode is positioned along the length of the distal end portion of the lead body to deliver cardioverting/defibrillating electrical stimuli to the tissue of the right ventricle of the heart; and

the second conductive polymer electrode is positioned along the length of the distal end portion of the lead body to deliver cardioverting/defibrillating electrical stimuli to the tissue of the superior vena cava of the heart.

99. The lead of claim 96 in which:

the distal end portion of the lead body is adapted for left side implantation;

the first mentioned conductive polymer electrode is positioned along the length of the distal end portion of the lead body to deliver cardioverting/defibrillating electrical stimuli to the wall of a vessel within the coronary sinus region of the heart; and

the second conductive polymer electrode is positioned along the length of the distal end portion of the lead body to deliver cardioverting/defibrillating electrical stimuli to the tissue of the superior vena cava of the heart.

100. The lead as of claim 99 in which:

the distal end portion of the lead body is isodiametric.

101. The lead of claim 96 in which:

the distal end portion of the lead body is adapted for left side implantation;

the first mentioned conductive polymer electrode is positioned along the length of the distal end portion of the lead body to deliver cardioverting/defibrillating electrical stimuli to the coronary sinus of the heart; and

the second conductive polymer electrode is positioned along the length of the distal end portion of the lead body to deliver cardioverting/defibrillating electrical stimuli to a vein overlying the left side of the heart.

102. The lead as of claim 101 in which:

the distal end portion of the lead body is isodiametric.

103. The lead of claim 96 in which:

the lead body includes a multilumen housing, a first one of the lumens of the housing containing the first mentioned cable conductor and a second one of the lumens containing the second cable conductor.

104. The lead of claim 103 in which:

the multilumen housing includes a third lumen, the third lumen containing a lining extending from the proximal end portion of the lead body to the distal end portion thereof, the lining passing through the lengths of the first and the second conductive polymer electrodes and being encapsulated thereby, the lining being adapted to guide a stylet during implantation of the lead.

105. The lead of claim 96 in which:

the portion of each of the cable conductors encapsulated by the associated conductive polymer electrode includes area-

increasing structure for enhancing the bond between the electrode and the cable conductor.

106. The lead of claim 105 in which:

the area-increasing structure is selected from the group consisting of a roughened surface of the cable conductor, a knurled surface of the cable conductor, projections extending from a surface of the cable conductor, beads attached to a surface of the cable conductor, mesh attached to a surface of the cable conductor, longitudinally spaced apart wire loops attached to a surface of the cable conductor, and wire wound around and attached to a surface of the cable conductor.

107. The lead of claim 96 in which:

each conductive polymer electrode comprises a polymer formulated to be intrinsically conductive.

108. The lead of claim 107 in which:

the polymer is selected from the group consisting of polyacetylene, polypyrrole, polyaniline, polythiophene, fluorophenyl thiophene, polyphenylene vinylene, polyphenylene sulfide, polynaphthalene, and polyphenylene.

109. The lead of claim 96 in which:

each conductive polymer electrode comprises an insulating, biocompatible polymer having conductive particles dispersed therein.

110. The lead of claim 109 in which:

the insulating polymer is selected from the group consisting of silicone rubber, polyurethane, and styrene-ethylene-butylene-styrene block polymer.

111. The lead of claim 109 in which:

the conductive particles comprise particles selected from the group consisting of silver, stainless steel, iridium, silver-coated nickel, carbon black, graphite, tantalum, palladium, titanium, platinum, gold, MP35N, fullerines, and carbon nanotubes.

112. The lead of claim 96 in which:

each of the conductive polymer electrodes comprises a molded structure.

113. A body implantable lead suitable for electrically stimulating and/or sensing the tissue of the left side of the heart, the lead comprising:

a lead body having an isodiametric distal end portion configured to passively anchor the lead in the coronary sinus region of the heart;

a distal tip electrode adapted to be placed in a vessel in the coronary sinus region;

at least one conductive polymer electrode disposed along the distal end portion of the lead proximally of the tip electrode, the conductive polymer electrode being positioned along the distal end portion of the lead body so as to be placed in a vessel in the coronary sinus region, the at least one conductive polymer electrode being adapted to perform one or more of the functions consisting of pacing, sensing, cardioversion and defibrillation;

a first electrical conductor within the lead body coupling the tip electrode with a connector assembly at the proximal end of the lead body; and

a second electrical conductor within the lead body coupling the conductive polymer electrode with the connector assembly.

114. The lead of claim 113 in which:

the at least one conductive polymer electrode comprises a ring sensing electrode for sensing electrical signals generated by the left side of the heart.

115. The lead of claim 113 in which:

the at least one conductive polymer electrode is disposed within a window formed in the lead body.

116. The lead of claim 115 in which:

the distal end portion of the lead body has an outer circumferential surface, the window extending about a portion of the outer circumferential surface.

117. The lead of claim 113 in which:

the at least one conductive polymer electrode comprises a cardioverting/defibrillating electrode positioned along the distal end portion of the lead body and configured to deliver electrical shocks to the coronary sinus region of the heart.

118. The lead of claim 113 which includes:

a second conductive polymer electrode disposed along the distal end portion of the lead body, the second conductive polymer electrode being positioned along the distal end portion of the lead body and being configured to deliver electrical cardioverting/defibrillating shocks to the coronary sinus region of the heart; and

a third electrical conductor within the lead body coupling the second conductive polymer electrode with the connector assembly.

119. The lead of claim 118 in which:

each of the conductive polymer electrodes is disposed in a window formed in the lead body.

120. The lead of claim 118 in which:

the lead body includes a multilumen housing, each of the first, second and third electrical conductors being contained in separate ones of the lumens of the multilumen housing.

121. The lead of claim 113 which includes:

a second conductive polymer electrode disposed along the distal end portion of the lead body, the second conductive polymer electrode being positioned along the distal end portion of the lead body and being configured to deliver electrical cardioversion/defibrillating shocks to the superior vena cava of the heart; and

a third electrical conductor within the lead body coupling the second conductive polymer electrode with the connector assembly.

122. The lead of claim 121 in which:

each of the conductive polymer electrodes is disposed in a window formed in the lead body.

123. The lead of claim 121 in which:

the lead body includes a multilumen housing, each of the first, second and third electrical conductors being contained in separate ones of the lumens of the multilumen housing.

124. The lead of claim 113 in which:

the second electrical conductor comprises a cable conductor.

125. The lead of claim 124 in which:

a portion of the cable conductor is encapsulated by the at least one conductive polymer electrode, said portion including area-increasing structure for enhancing the bond between the at least one electrode and the cable conductor.

126. The lead of claim 125 in which:

the area-increasing structure is selected from the group consisting of a roughened surface of the cable conductor, a knurled surface of the cable conductor, projections extending from a surface of the cable conductor, beads attached to a surface of the cable conductor, mesh attached to a surface of the cable conductor, longitudinally spaced apart wire loops attached to a surface of the cable conductor, and wire wound around and attached to a surface of the cable conductor.

127. The lead of claim 113 in which:

the at least one conductive polymer electrode comprises a polymer formulated to be intrinsically conductive.

128. The lead of claim 127 in which:

the polymer is selected from the group consisting of polyacetylene, polypyrrole, polyaniline, polythiophene, fluorophenyl thiophene, polyphenylene vinylene, polyphenylene sulfide, polynaphthalene, and polyphenylene.

129. The lead of claim 113 in which:

the at least one conductive polymer electrode comprises an insulating, biocompatible polymer having conductive particles dispersed therein.

130. The lead of claim 129 in which:

the insulating polymer is selected from the group consisting of silicone rubber, polyurethane, and styrene-ethylene-butylene-styrene block polymer.

131. The lead of claim 129 in which:

the conductive particles comprise particles selected from the group consisting of silver, stainless steel, iridium, silver-coated nickel, carbon black, graphite, tantalum, palladium, titanium, platinum, gold, MP35N, fullerines, and carbon nanotubes.

132. The lead of claim 113 in which:

the at least one conductive polymer electrode comprises a molded structure.

133. A method of fabricating a body implantable lead comprising the steps of:

providing an insulative housing containing at least one electrical conductor;

removing one or more sections of the insulative housing along the distal end portion thereof to expose one or more sections of the electrical conductor;

encapsulating the exposed section(s) of the electrical conductor in a conductive polymer in a plasticized, uncured or molten state, the conductive polymer being in electrical contact with the exposed section(s) of the electrical conductor; and

curing or solidifying the conductive polymer.

134. The method as of claim 133, including the steps of:

placing a portion of the insulative housing including the removed section(s) thereof within the cavity of a mold;

injecting into the cavity the conductive polymer in the plasticized, uncured or molten state; and

removing the mold after the conductive polymer is cured or solidified.

135. The method as of claim 133, including the steps of:

providing a compression mold comprising mold halves each defining a recess, the recesses together forming a mold cavity when the mold halves are joined;

substantially filling the recess in at least one of the mold halves with a conductive polymer in a plasticized, uncured or molten state;

placing a portion of the insulative housing including the removed section(s) thereof within the recess of one of the mold halves;

joining the mold halves thereby forcing the uncured or molten conductive polymer to encapsulate the exposed section(s) of the electrical conductor and to be in electrical contact therewith; and

removing the mold after the conductive polymer is cured or solidified.

136. A method of fabricating a body implantable lead comprising the steps of:

placing at least two insulated, electrical conductors in side-by-side relationship;

stripping the insulation from a section along the length of one of the at least two conductors; and

molding a conductive polymer electrode about the at least two conductors so that the electrode is in electrical contact with substantially the entire length of the stripped section of the one conductor.

137. The method as of claim 136 including the steps of:

stripping the insulation from a section along the length of a second of the at least two conductors, the stripped section of the second conductor being spaced apart longitudinally from the stripped section of the first conductor; and

molding a second conductive polymer electrode about the at least two conductors so that the second electrode is in electrical contact with substantially the entire length of the stripped section of the second conductor, the second electrode being spaced apart from the first electrode along the length of the at least two conductors.